United Nations ESCAP/81/15

Economic and Social Council

Distr.: General
30 January 2025

Original: English

Economic and Social Commission for Asia and the Pacific

Eighty-first session
Bangkok, 21–25 April 2025
Item 5 (f) of the provisional agenda*
Review of the implementation of the 2030 Agenda for Sustainable Development in Asia and the Pacific and issues pertinent to the subsidiary structure of the Economic and Social Commission for Asia and the Pacific: transport

Enhancing the resilience and sustainability of urban public transport systems in Asia-Pacific cities

Note by the secretariat

Summary

The frequency and intensity of natural and human-induced climate events are increasing in Asia and the Pacific, seriously affecting the transport infrastructure, services and human life. While it is crucially important for the transport sector to become more resilient, sustainability too must be pursued. This requires a shift towards accessible, inclusive, safe and environmentally friendly urban transport systems that prioritize low-carbon solutions. Such an approach not only mitigates climate-related impacts but also ensures equitable mobility options for all residents, fostering sustainable urban growth in the region.

In the present document, the secretariat provides information on the current state of urban public transport systems in Asia-Pacific cities and describes recent developments, emerging trends and ways in which the secretariat has helped member States to improve the accessibility, sustainability, safety and resilience of such systems.

The secretariat proposes various measures and policies that could further improve public transport systems while implementing the Paris Agreement and the 2030 Agenda for Sustainable Development.

The Economic and Social Commission for Asia and the Pacific may wish to take note of the findings and policy recommendations contained in the present document and provide further guidance to the secretariat in that regard.

* ESCAP/81/1.

Please recycle

I. Introduction

1. The Asia-Pacific region is urbanizing: more than 2.2 billion people currently live in its cities, and this number is expected to surge by 50 per cent by 2050, adding an additional 1.2 billion urban residents.[1] This growth presents both opportunities and challenges. One of the most urgent challenges faced by the region's cities is the rapid rise in demand for urban public transport. Urban mobility is essential for city residents, as it facilitates access to employment, education, healthcare and other vital services and opportunities. The demand for passenger transport is anticipated to double in South-East Asia and grow by 92 per cent in South and South-West Asia by 2050.[2] The number of urban vehicles in the region is currently doubling every six years.[3]

2. According to an analysis of road safety data for 2021 based on the *Global Status Report on Road Safety 2023*, published by the World Health Organization (WHO), there were more than 700,000 road traffic deaths in the region, around two thirds of which involved vulnerable road users. Given that pedestrians, cyclists and riders of motorized two- and three-wheelers are usually concentrated in urban areas, road safety in urban areas remains a critical challenge.

3. Smart transport systems and digital technologies are increasingly being adopted by public transport operators to improve the efficiency, safety, sustainability and resilience of their systems. Emerging digital technologies are being effectively used for route planning, road toll collection, the provision of ridesharing and on-demand services and traffic management, thus reducing congestion, optimizing transport operations and enhancing the overall travel experience.

4. Across the region, various forms of public transport systems are being developed – such as metro, light rail transit, urban rail, bus rapid transit, bus and minibus systems – which are complemented by various types of informal transport. Yet 41 per cent of the urban population lacks convenient access to public transport systems.[4] Factors like inadequate service levels, lack of integration among different modes of transport and inadequate design considerations in infrastructure planning have affected the accessibility of public transport systems. A further challenge is a lack of social inclusiveness, which would ensure that transport systems and services were available to all segments of society, including marginalized groups such as low-income households, older persons and persons with disabilities.

5. The region witnessed an increase in the frequency and intensity of natural disasters and climate events in 2024. Such events, including cyclones

[1] See https://unhabitat.org/asia-and-the-pacific-region.

[2] Organisation for Economic Co-operation and Development (OECD) and International Transport Forum, *ITF Transport Outlook 2023* (Paris, OECD Publishing, 2023).

[3] Asian Development Bank (ADB), "ADB's work in sustainable transport". Available at www.adb.org/what-we-do/topics/transport/overview.

[4] United Nations Human Settlements Programme (UN-Habitat), "Urban transport", Urban Indicators database. Available at https://data.unhabitat.org/pages/urban-transport (accessed on 20 December 2024).

in Bangladesh,[5] unprecedented rain and floods in Nepal,[6] floods in Viet Nam,[7] floods and mudflow in Thailand[8] and cyclones and storms in the Philippines,[9] to name but a few, significantly damaged transport and public transport infrastructure and disrupted transport operations. In Nepal, according to a preliminary loss and damage assessment report, an estimated $207 million would be needed for the repair and reconstruction of highways damaged by floods and rain. In Viet Nam, an estimated $123 million would be needed to cover the loss and damage caused to roads and railways by Typhoon Yagi.

6. Not only is the transport sector affected by the impacts of climate change, but it also contributes to climate change through emissions from vehicles. In 2022, road transport carbon dioxide emissions accounted for 75 per cent of global transport emissions and 89 per cent of transport emissions in Asia.[10] Despite efforts made by Governments to reduce emissions, transport-sector carbon dioxide emissions in Asia grew by 36 per cent from 2010 to 2021.[11]

7. Given the challenges outlined above, national and local governments need to work towards implementing integrated, sustainable and resilient urban public transport systems. Doing so involves integrating urban and transport planning; integrating various modes of transport and active mobility; considering transit-oriented development and additional public transport routes to increase accessibility; utilizing smart transport systems to enhance efficiency and sustainability; addressing the transport needs of diverse social groups to enhance inclusiveness; considering the likely impacts of climate events on infrastructure design; and enhancing urban safety through speed management and the design of safe infrastructure under the safe system approach.

II. Current state of urban public transport systems

A. Public transport modes

8. Metro, light rail transit, urban rail, bus rapid transit, bus, minibus and river ferry are the main modes of public transport in the Asia-Pacific region. In addition, various types of informal transport operate in inner city areas and complement the public transport systems in cities. According to vehicle fleet data from the *Global Status Report on Road Safety 2023*, motorized two- and three-wheelers account for a dominant share of transport modes in South and South-West Asia and in South-East Asia. Many cities lack proper infrastructure

[5] United Nations, “On the frontline of climate change – WFP responds to Cyclone Remal, the first cyclone of 2024 in Bangladesh”, 3 July 2024.

[6] International Centre for Integrated Mountain Development, “Death toll climbs as torrential rains pound Nepal”, 28 September 2024.

[7] International Federation of Red Cross and Red Crescent Societies, “Millions affected as Super Typhoon Yagi hits Vietnam”, 13 September 2024.

[8] “Thai PM: mud must be cleared from Chiang Rai promptly”, *Bangkok Post*, 22 September 2024.

[9] World Food Programme (WFP), “WFP Philippines: 2024 typhoon season situation report no. 6”, 16 December 2024.

[10] Sudhir Gota and Cornie Huizenga, *The Contours of a Net Zero Emission Transport Sector in Asia: Background Paper* (Manila, ADB, 2023).

[11] Partnership on Sustainable, Low Carbon Transport, “SLoCaT transport, climate and sustainability global status report: 3rd edition – module 1: transport pathways to reach global climate and sustainability goals – key insights” (Brussels, 2023).

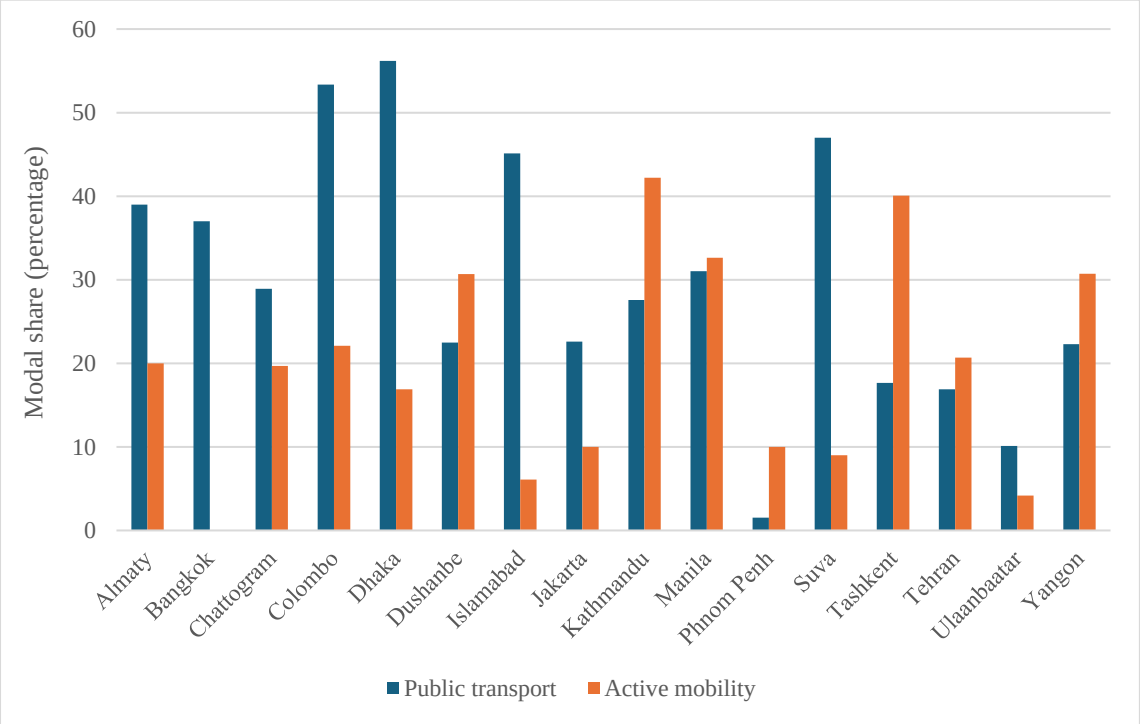
and facilities for active mobility modes such as walking and cycling. Private vehicles account for 70 per cent of all motor vehicles in the region, resulting in increased air pollution, traffic fatalities and congestion. It is estimated that congestion costs South-East Asian countries between 2 to 5 per cent of gross domestic product (GDP).[12]

9. According to data for selected cities in the Asia-Pacific region, many cities have a low share of public transport and a high share of active mobility in the total number of commutes (see figure I). Cities like Bangkok, Dhaka, Hanoi, Ho Chi Minh City, Jakarta and Vientiane are investing in the development of mass transit systems, but many struggle to maintain, let alone increase, the modal share of public transport, often due to insufficient investment in public transport systems. As a result of an insufficient supply of public transport options, a shift from public to private transport is forecast to continue through to 2030. In order for governments to reverse this trend, improved integration between multiple modes of transport is needed, with public transport at the heart of such efforts. Physical integration, service integration and fare integration are key components of efficient public transport systems because they make transfers between modes and operators convenient and effortless. Integrated fare and digital payment systems have been implemented in cities like Almaty, Seoul, Singapore, Tashkent and Tokyo. However, in Bangkok, for example, where various modes of public transport operate, integrated fare and payment systems have yet to be implemented for public transport.

10. Active mobility, which includes walking and cycling, is key for addressing the demand for first- and last-mile connectivity to public transport. While the modal share of active mobility is already high, providing safe, convenient and efficient infrastructure for walking and cycling can attract more commuters to active mobility and, ultimately, to public transport.

[12] ADB, *Trend Cards: Reimagining the Future of Transport across Asia and the Pacific* (Manila, 2022).

Figure I
Modal share of public transport and active mobility in selected cities

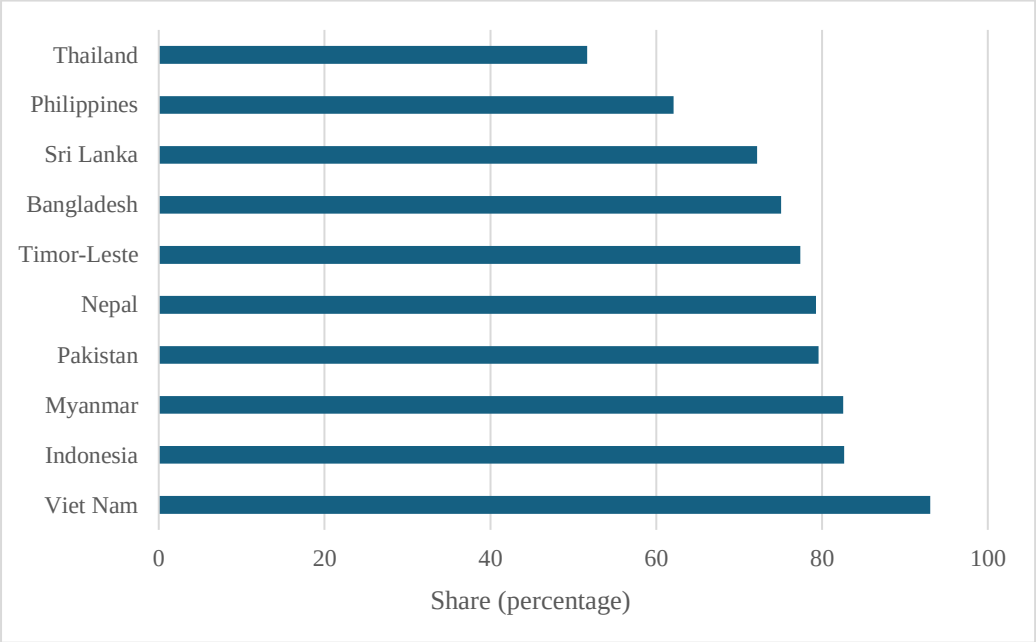


Source: Economic and Social Commission for Asia and the Pacific (ESCAP) calculations based on data from sustainable urban transport index mobility assessment reports for the most recent year available. Available at www.unescap.org/our-work/transport/suti.

Note: No active mobility data was available for Bangkok at the time of compilation.

11. For most countries in South and South-West Asia and in South-East Asia, motorized two- and three-wheelers play an important role in mobility, accounting for more than 60 per cent of the total vehicle fleet (see figure II). In cities like Bangkok and Jakarta, motorcycles offer on-demand public transport services. But while they offer cheap and convenient mobility options, they also cause traffic congestion and pollution and have poor safety records.

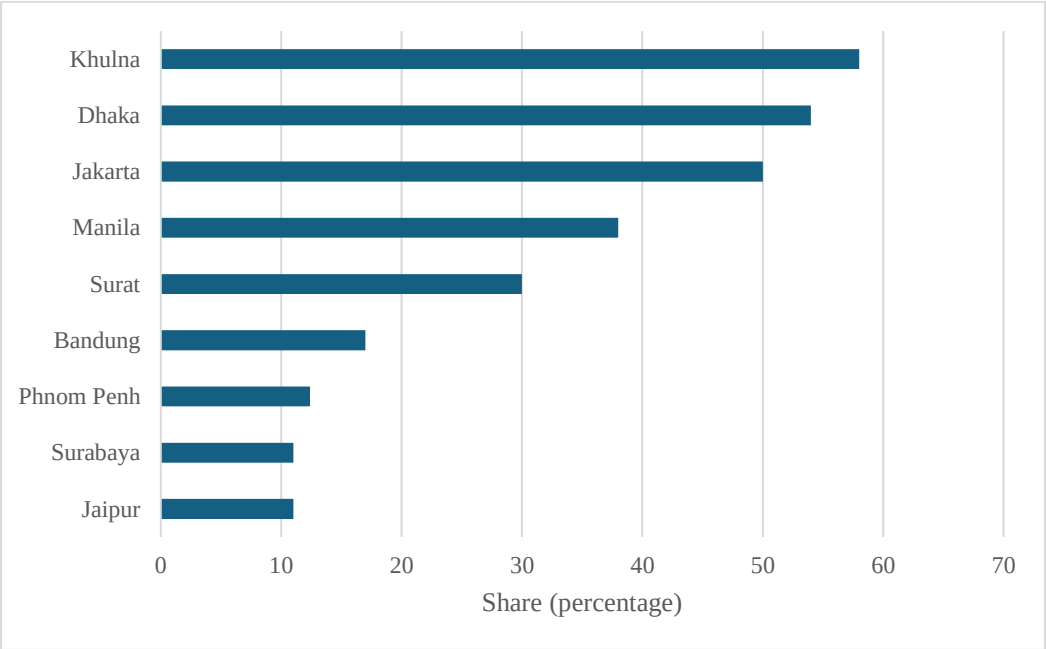
Figure II
Share of motorized two- and three-wheelers in the total vehicle fleet in selected countries, 2021



Source: ESCAP calculations based on WHO, *Global Status Report on Road Safety: Country and Territory Profiles* (Geneva, 2023).

12. Cities where informal transport is used by a substantial share of commuters include Dhaka, Jakarta, and Khulna (more than 50 per cent) and Manila (38 per cent) (see figure III). Shared taxis, minibuses, jeepneys, *angkots*, auto-rickshaws, tempos and tuk-tuks are examples of motorized informal transport that serve as flexible and demand-responsive options. These modes are popular among low-income commuters and also address the demand for first- and last-mile connectivity. There is a need to integrate informal transport into overall public transport planning and to address issues such as poor safety standards and lack of convenience by introducing services to feeder routes and providing supporting infrastructure, such as parking areas and passenger bays, along routes.

Figure III
Modal share of informal transport in selected cities



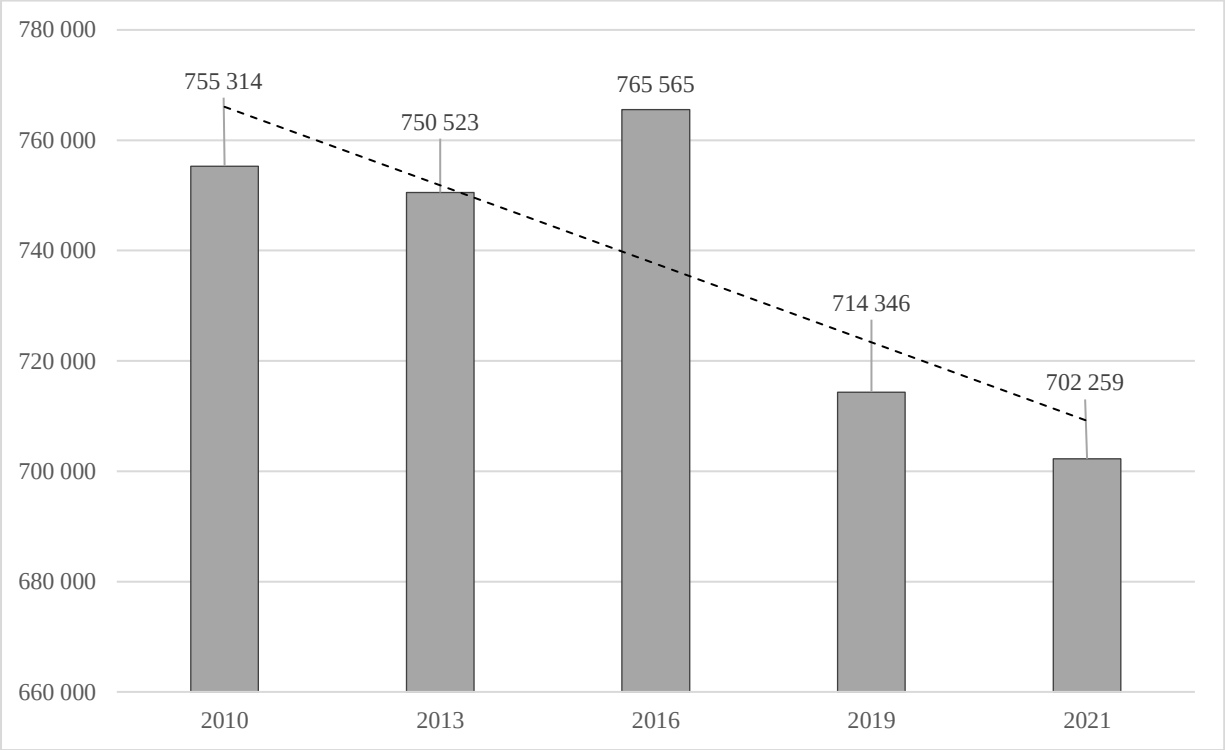
Source: ESCAP calculations based on data from sustainable urban transport index mobility assessment reports for the most recent year available. Available at www.unescap.org/our-work/transport/suti.

B. Urban road safety

13. The road safety situation varies significantly among urban areas in the region. Diverse socioeconomic conditions, varying transport patterns and rapid urbanization present unique challenges to addressing road safety issues at the regional and subregional levels. Furthermore, a recent rise in the number of motorized two-wheelers and electric vehicles in the traffic mix and changes in travel patterns since the coronavirus (COVID-19) pandemic have influenced road safety dynamics in urban areas.

14. There has been a significant decrease in the estimated number of road traffic deaths in Asia and the Pacific since 2016 (see figure IV). A disproportionate number of road traffic deaths occur in lower-middle-income countries, which account for more than 40 per cent of the regional population but more than 55 per cent of road traffic deaths.

Figure IV
Estimated number of road traffic deaths in the Asia-Pacific region, 2010–2021



Source: ESCAP calculations based on data from different editions of the *Global Status Report on Road Safety*.

15. Road traffic crashes cost most countries around 3 to 5 per cent of their GDP. At the regional level, an analysis by the secretariat[13] has shown that the economic costs of road traffic deaths alone in 2021 amounted to $730 billion and that including the costs of road traffic injuries brought that total to an estimated $2.5 trillion. The social impact of road crashes is enormous in the urban areas of the region. For instance, studies on Bangladeshi and Indian cities have shown that when the main income earner of a household loses the ability to work due to a road crash, it often pushes the household into poverty, which can be difficult to recover from.

16. Ensuring the safety of vulnerable road users (including non-motorized road users, such as pedestrians and cyclists, and riders of motorized two- and three-wheelers) is a major urban safety challenge in the region. Vulnerable road users are involved in a significant share of the overall number of road traffic deaths in the region, accounting for 67 per cent in 2021. Users of motorized two- and three-wheelers alone accounted for 35 per cent.

17. Ways to help improve urban safety include providing adequate public transport, designing safe infrastructure, enforcing helmet wearing, addressing unsafe driver behaviours and managing speed in urban areas. Urban speed management in particular remains an ongoing challenge, with only eight countries in the region having adopted the WHO-recommended maximum urban speed limit of 50 km per hour. This speed limit is vital for protecting vulnerable road users such as pedestrians and cyclists.

[13] ESCAP/CTR(8)/7.

C. Smart transport and digital technologies

18. Smart transport systems and digital technologies are gaining popularity in the region. By prioritizing the movement of people over the movement of vehicles, these systems can be used to reduce congestion, optimize transport systems and enhance the overall travel experience. Examples include ridesharing, e-scooter sharing and demand-responsive transport. However, the level of application of such technologies varies among countries in the region. For example, Australia, Japan, the Republic of Korea and Singapore are all at an advanced stage of application of smart transport technologies, while many other countries in the region still have significant potential to scale up the use of such technologies.

19. Collaboration and the adoption of national road maps play a critical role in driving progress on smart transport systems. Many Governments in the region have developed national policies and frameworks to support the adoption of smart transport systems. The Government of the Republic of Korea has implemented a national intelligent transport system master plan covering the period until 2030, which builds on earlier national intelligent transport system frameworks.[14] In China, the Government has established a vision and road map for the transport sector in which it sets out its long-term strategy to become a global transport super-Power by 2050.[15] In Central Asia, strategies like the Georgia Country Strategy 2021–2026[16] and the Digital Kazakhstan programme[17] include a focus on digitalization and green transport through smart transport technologies.

D. Accessibility and social inclusion

20. Ensuring accessibility means ensuring that public transport services are convenient and affordable for everyone. In the region, around 41 per cent of the urban population still lacks convenient access to public transport.[18] Many inclusive transport policies in the region are currently limited to providing safe walkways, sidewalks and bicycle lanes; women-only public transport services to reduce harassment; and safety features, such as proper lighting, surveillance, segregated areas and staff trained to assist women commuters.[19]

21. Another challenge to providing inclusive public transport is the lack of sufficient data to systematically and comprehensively plan for inclusive mobility. In some cities in the region, in addition to a lack of general data availability, a lack of data management plans, cohesive data collection methodologies and standards, and clear objectives for data collection also poses a challenge. Intersectoral data-sharing is lacking, and data is currently not being analysed under thematic angles like accessibility or infrastructure design to reflect the travel behaviours of different social groups.

---

[14] Smart City Korea, “MOLIT establishes the master plan for intelligent transportation system 2030 ('21~'30)”, 19 October 2021.

[15] German Agency for International Cooperation, “Outline for building China’s strength in transport” (Beijing, 2019).

[16] European Bank for Reconstruction and Development, “Georgia country strategy 2021–2026” (London, 2021).

[17] See https://egov.kz/cms/en/digital-kazakhstan.

[18] UN-Habitat, “Urban transport”, Urban Indicators database. Available at https://data.unhabitat.org/pages/urban-transport (accessed on 20 December 2024).

[19] See www.unescap.org/events/2024/regional-meeting-enhancing-social-inclusion-and-innovations-urban-transport-systems.

22. Cities are increasingly adopting strategic transport planning approaches to reduce travel times, optimize routes and maintain the affordability of systems. One aspect of transport development that remains largely overlooked in most cities and countries, however, is inclusive public transport services and infrastructure, despite the fact that they would create economic and social benefits for all by improving access to jobs, education, healthcare and other services and opportunities for all social groups.

23. Transport should respond to the needs of different groups. Women tend to make shorter trips and travel more during off-peak hours than men. They also tend to rely more on walking, public transport, motorcycles, cars and ridesharing services. Older persons tend to travel less frequently and for shorter distances. People living in low-income households mostly travel by informal transport, walking and cycling in urban areas.

24. With these differences in travel behaviour across social groups, public transport systems and infrastructure should be designed to better cater to the variety of needs and constraints, which would ultimately lead to more accessible and inclusive public transport. Many local governments in the region are planning and implementing policies, programmes and projects to improve urban public transport systems. Effective governance of urban public transport systems can significantly enhance the quality of life of urban residents by prioritizing inclusive mobility policies; adopting universal design principles; ensuring that public transport systems are physically accessible and that they reach underserved areas; and making systems safe and affordable with subsidized fare structures.

E. Disaster resilience and adaptation

25. The frequency and intensity of extreme climate and weather events in 2024 were much higher than in previous years. In addition to the toll these events took on human lives, they also caused damage to public transport infrastructure and disrupted transport operations. Several cities, such as Bangkok, Dhaka, Hanoi, Kathmandu and Kuala Lumpur, experienced significant impacts on their public transport systems. Many roads and bridges were submerged and damaged. Public transport systems in coastal cities, such as Jakarta, Ho Chi Minh City and Manila, were affected by rising sea levels. To date, responses to such events have tended to be reactive rather than planned and systematic, demonstrating the need for comprehensive resilience and adaptation strategies to cope with the impacts of climate change.

26. Developing public transport systems to withstand the impacts of climate change is vital for ensuring the continuity of services. Infrastructure adaptation involves reinforcing bridges, building flood-resistant roads and railways and using durable construction materials to ensure longevity under changing climate conditions. For example, elevating roads and railways in flood-prone areas and installing drainage systems can prevent water accumulation. In Bangkok, work has begun to retrofit public transport facilities to handle seasonal flooding by constructing flood barriers and drainage tunnels, installing pumping stations, designating flood retention areas and ensuring that key routes remain operational even during extreme weather events. In Kuala Lumpur, investments are being made in climate-proof stations that are designed to be energy-efficient and resistant to rising temperatures.

F. Low-carbon mobility

27. Transport-related fuel combustion accounts for about one quarter of direct carbon dioxide emissions worldwide, with fossil fuels supplying 91 per cent of the energy consumed by the transport sector.[20] Road transport is the largest contributor, responsible for 75 per cent of global transport emissions and 89 per cent in Asia.[21] The region is poised for significant growth in passenger transport demand due to population growth, economic development and urbanization. Without strong policy measures, transport-related carbon dioxide emissions in the region could rise by nearly 50 per cent over the next 30 years.[22]

28. Recognizing this, many Governments in the region have committed to reducing transport-sector emissions in their nationally determined contributions. Of the 51 States members of the Economic and Social Commission for Asia and the Pacific that have submitted nationally determined contributions, 38 have included transport-specific measures, such as emission reduction targets, promotion of public transport, electric mobility, the use of alternative energy sources and the use of automated digital transport solutions.[23] However, despite these efforts, the region's transport-sector carbon dioxide emissions rose by 36 per cent between 2010 and 2021.[24]

29. To implement their nationally determined contributions, many Governments are implementing policies to promote electric and alternative-fuel vehicles and automated and intelligent transport systems to set their transport sectors on a sustainable, low-carbon pathway. In China, early policy support for the electrification of public transport meant that the country accounted for about 90 per cent of electric bus sales worldwide in 2020, which moderated to 60 per cent in 2023 as sales increased in other regions.[25] In Thailand, registrations of electric buses increased 709 per cent year-on-year from 2017 to 2022,[26] while in India, a scheme on the faster adoption and manufacturing of hybrid and electric vehicles has supported the deployment of 5,600 electric buses in 64 cities. In Moscow, only electric buses are being purchased to add to the fleet of 1,000 buses currently in operation.[27] In Davao City, Philippines, the procurement of 380 electric buses is planned as part of a project for improving the public transport system, which includes a complete phase-out of diesel-powered jeepneys.

[20] International Energy Agency, "Transport". Available at www.iea.org/energy-system/transport.

[21] Sudhir Gota and Cornie Huizenga, *The Contours of a Net Zero Emission Transport Sector in Asia*.

[22] OECD and International Transport Forum, *ITF Transport Outlook 2021* (Paris, OECD Publishing, 2021).

[23] Partnership on Sustainable, Low Carbon Transport, "SLoCaT transport, climate and sustainability global status report: 3rd edition. – module 1: transport pathways to reach global climate and sustainability goals – key insights".

[24] Ibid.

[25] International Energy Agency, *Global EV Outlook 2024: Moving Towards Increased Affordability* (Paris, 2024), p. 60.

[26] ESCAP, *Study Report for Transitioning to Electric Public Buses in Thailand* (Bangkok, 2023), p. 8.

[27] Green Car Congress, "Starting this year, Moscow will only buy electric buses", 2 July 2021.

30. The use of renewable energy in transport is another measure being adopted by Governments. However, despite various policy efforts and incentives to promote the use of renewable and alternative energy in transport operations, the share of renewable energy use in the transport sector is only 4 per cent.[28] Additional efforts are required to increase the share of renewables in the energy mixes of countries of the region, for example by exploring hydropower, solar and wind sources.

31. There is a growing interest in electric vehicles, but their adoption requires collaboration among the transport, energy and finance sectors. The high upfront capital expenditure required remains one of the largest hurdles to uptake, in particular for batteries and charging infrastructure. Another challenge for Governments is the need to increase the share of renewable energy generation capacity and enhance grid performance to sustain peak loads from electric vehicle charging. Electrification often starts with public transport fleets (such as buses), ride-hailing fleets of two- and four-wheelers and last-mile delivery vehicles, before gradually expanding to private vehicles.

III. Recent developments and efforts to improve public transport

A. Integrated public transport systems

32. Many cities in the region are growing their public transport systems through network expansions and the introduction of high-capacity public transport modes. The transition to sustainable mobility is occurring at a rapid pace and cities are at different stages of development. City authorities and transport operators need to work together to plan, develop and operate integrated public transport systems to provide seamless travel for commuters.

33. Through its sustainable urban transport index, the secretariat is continuing to provide technical support to national and local governments for the assessment of urban mobility sustainability. The index uses a framework of 10 indicators, covering the social, economic and environmental dimensions of sustainable urban transport, to summarize, track and compare the performance of sustainable urban transport systems. The index can be used to obtain a picture of the state of public transport performance in a city by measuring aspects relating to planning, access, safety, quality, reliability, affordability and emissions. The index has so far been used in more than 35 cities covering all five subregions. Recently, the secretariat provided policy and capacity-building support to Almaty, Kazakhstan; Bukhara, Uzbekistan; Chattogram, Bangladesh; Dushanbe, Tajikistan; Lautoka, Fiji; and Tashkent, Uzbekistan to assess the sustainability and maturity of their urban mobility systems.

34. The secretariat is working on expanding the indicators in the sustainable urban transport index to include more social inclusion-related indicators, to be launched after a pilot phase in multiple cities, with a focus on those in the Pacific.

35. The secretariat has developed several knowledge products focused on planning for integrated public transport systems, such as *Integrated Public Transport Systems: A Guidebook for Policymakers*[29] and *Integrated Public Transport Systems: A Compendium of Good Practices from Asia and the*

[28] Renewable Energy Policy Network for the 21st Century, *Renewables 2023 Global Status Report Collection: Global Overview* (Paris, 2023).

[29] ST/ESCAP/3-TR/11.

Pacific.[30] These two publications contain a step-by-step approach for planning integrated public transport systems with the use of digital technologies and examples of good practices from the region.

36. The secretariat has provided policy support to member States on public transport strategy and transit-oriented development. Adopting an integrated public transport vision and strategy and developing a sustainable urban mobility plan can help to improve mobility in cities. Local governments can also implement short-term measures, such as bus priority lanes, to ease traffic congestion and reduce pollution. Access to renewable energy sources plays an important role in the transition to an integrated and sustainable public transport system. Hence, any efforts to accelerate the transition towards sustainable urban mobility need to be cross-sectoral, covering public transport, electric mobility and renewable energy, and involve green funding mechanisms.

B. Road safety

37. In its resolution 74/299 on improving global road safety, the General Assembly proclaimed the period 2021–2030 as the Second Decade of Action for Road Safety, with a goal of reducing road traffic deaths and injuries by at least 50 per cent. The Global Plan for the Decade of Action for Road Safety 2021–2030 is aimed at inspiring national and local governments, as well as other stakeholders that can influence road safety (including civil society organizations, academic institutions, private sector actors, donors and community and youth leaders), in the development of national and local action plans and targets for the Second Decade of Action. It contains five recommended actions, one of which is to encourage multimodal transport and land-use planning. In its resolution 78/290 on improving global road safety, the Assembly urged Member States and relevant actors to accelerate and scale up efforts to implement the Global Plan for the Decade of Action for Road Safety 2021–2030, making road safety a political priority and ensuring its relevance in the broader sustainable development agenda.

38. Road safety is one of the priority areas for the region, and the secretariat is implementing several projects to complement the efforts of Governments to improve urban road safety. In South-East Asia, the secretariat is implementing a campaign to raise awareness of the benefits of applying anti-lock brakes on motorcycles and to foster a subregion-wide commitment to passing laws requiring the use of such brakes. The secretariat is supporting the Government of Thailand to improve the safety of motorized two-wheelers, is supporting the Government of Viet Nam to enhance road safety in school zones and recently completed a project to improve the driver licensing system in the Lao People's Democratic Republic. In order to support countries in North and Central Asia, the secretariat is working to develop a safer road design standard and to strengthen the capacity of road engineers to design safer roads. In the Islamic Republic of Iran, the secretariat is working to strengthen the capacity of the National Road Safety Commission to act as the lead national road safety agency. Furthermore, the secretariat is supporting the Government of Nepal to enhance road safety and build robust national capabilities in road safety management.

[30] ST/ESCAP/3-TR/12.

C. Smart mobility and innovations

39. Big data have become a cornerstone of smart transport systems, offering transformative opportunities for strategic planning and real-time decision-making. Such data are collected and analysed through innovative platforms, enabling more informed policymaking. For example, the Australian Urban Research Infrastructure Network provides access to a centralized platform of transport-related data, allowing critical urban issues, such as pollution, safety and unemployment, to be addressed.[31] In Seoul, big data are being used to optimize late-night bus routes and customize services to the needs of vulnerable groups. In Hangzhou, China, the City Brain platform uses artificial intelligence to manage traffic signals dynamically, significantly reducing congestion.[32] In Singapore, the Fusion Analytics for Public Transport Emergency Response system integrates Internet of things sensor data to optimize bus routes, demonstrating how data-driven solutions can improve public transport efficiency and accessibility.[33]

40. In countries throughout the region, remarkable strides have been made in adopting and implementing smart transport technologies. Technologies and solutions such as mobility as a service, big data, cooperative intelligent transport systems, and connected and autonomous vehicles are being developed and deployed across the region. In the Philippines, ride-hailing and taxi services are very popular among users, and the market is expected to continue growing. In Australia, 36 demand-responsive transport service trials have been launched in areas where demand is too low or too inconsistent to operate regular public transport services. As part of these trials, routes are adjusted in real time, improving accessibility for a broad segment of the population. These services have reached more than one million residents, showcasing an innovative approach to public transport.[34] In China, a mobility-as-a-service initiative has been launched in collaboration with leading technology companies to advance sustainable mobility solutions.[35]

41. The secretariat presented policy guidelines on leveraging the use of big data for sustainable transport policymaking during an expert group meeting in Seoul in July 2023 and during a capacity-building workshop in Ulaanbaatar in September 2023. Recognizing the growing interest in smart mobility technologies, the secretariat initiated a project on strengthening the capacity of Pacific small island developing States to utilize smart mobility technologies for a fast transition to sustainable smart cities. A series of capacity-building workshops and policy dialogues were organized in Suva in May 2024, in Dushanbe in November 2024 and in Bangkok in April and November 2024.

[31] See https://aurin.org.au/.

[32] China, Information Office of Hangzhou Municipal People's Government, "City Brain system makes city smarter", 23 October 2020.

[33] See https://afi.io/case_studies/faster.

[34] Benjamin Kaufman, "1 million rides and counting: on-demand services bring public transport to the suburbs", *The Conversation*, 11 March 2020.

[35] MaaSification, "Beijing MaaS platform launches 'MaaS mobility for green city' initiative", 26 May 2021.

D. Accessibility and social inclusion

42. There has been growing focus on improving the accessibility and enhancing the social inclusiveness of public transport systems.

43. Efforts to make public transport services inclusive are isolated and often insufficient to comprehensively meet the needs of vulnerable transport users. In Nepal, for example, there are reserved seats for women and persons with disabilities in public transport. There are also women-only coaches in the Delhi metro and on the light rail transit in Manila.

44. Recognizing the importance of equitable mobility, many cities have adopted measures to meet the diverse needs of different population groups, including persons with disabilities, older persons and low-income earners. Investments in infrastructure have been pivotal. In Seoul, Singapore and Tokyo, for instance, networks of wheelchair-accessible buses and trains have been expanded, elevators and ramps have been installed at transit stations and tactile paving for visually impaired commuters has been enhanced. Such measures help to ensure that public transport is more inclusive and user-friendly for all.

45. Technological innovations have also played a critical role. In Jakarta and Bangkok, mobile applications and real-time transit information systems with accessible interfaces enable users to plan routes and check accessibility features. In some cities, discounted fares or free transit passes have been introduced for marginalized groups, fostering greater social inclusion.

46. With the objective of enhancing the capacity of transport policymakers to plan for and operate more socially inclusive and innovative urban transport systems, the secretariat implemented a project on enhancing social inclusion and innovations in Asia-Pacific urban transport systems and provided support to four pilot cities: Baku, Azerbaijan; Darkhan, Mongolia; Pokhara, Nepal; and Vientiane, Lao People’s Democratic Republic. An outcome of the project was the development of a set of regional guidelines on social inclusion and innovations.

E. Disaster resilience and adaptation

47. National and local governments are planning and designing transport infrastructure to withstand the impacts of extreme weather events, such as floods, storms and heatwaves. They are also using early warning and monitoring systems to improve preparedness and develop rapid disaster response plans to minimize damage and ensure passenger safety. Infrastructure adaptation involves reinforcing and increasing the height of bridges, building flood-resistant roads, railways and stations, and developing robust drainage systems. Development partners and multilateral banks are supporting governments to develop and implement climate-resilient transport projects. Emerging adaptation practices include assessing the risks of climate events, considering life-cycle costs and evaluating the trade-off between degree of resilience and cost. Public awareness campaigns can prepare commuters for likely disasters and emergencies. Many local governments, including those of Dhaka, Manila and Tokyo, have gained experience on disaster preparedness and response.

48. Community engagement has further driven progress and supported the planning and design of climate-adaptive public transport systems. National and local governments are using public consultations and participatory planning processes to plan and build more inclusive and resilient public transport

systems. In addition to enhancing the robustness of infrastructure, governments are educating and empowering vulnerable communities to better prepare them for the likely impacts of climate events and to enhance community resilience.

F. Transition to low-carbon mobility

49. The expected rise in demand for urban passenger transport caused by rapid urbanization will lead to increasing carbon dioxide emissions. In countries across the region, the share of transport-related emissions in total carbon dioxide emissions from fuel combustion ranges from 8 to 51 per cent. Eighty-nine per cent of transport-related carbon dioxide emissions in the region are from the road sector.[36] Of these emissions, 35 per cent are from medium and heavy trucks, 27 per cent from light-duty vehicles, 13 per cent from two-wheelers and 7 per cent from buses. Low-emission buses, especially electric buses, offer the most significant emissions-reduction potential in urban areas, especially on a per-passenger basis, owing to the high mileage, high capacity and relatively long lifespan of these vehicles. However, growth in public transport vehicles in the region has almost completely stagnated, standing at only 0.6 per cent annually between 2015 and 2020, versus 5.5 per cent between 2000 and 2015.[37]

50. The electrification of road transport vehicles has been recognized as a powerful low-carbon transport strategy by the Intergovernmental Panel on Climate Change. While electric mobility scale-up goals and strategies are already in place in many countries in the region, a number of implementation challenges and barriers remain, mainly related to charging infrastructure and upfront investment.

51. The adoption of green and sustainable transport solutions is essential for mitigating the impacts of climate change. Countries are at different stages of adopting low-emission technologies, such as electric buses, hydrogen-powered vehicles and energy-efficient trains. Initiatives like the introduction of electric buses in Bangkok, Kathmandu and Kuala Lumpur are an example of how Asian cities can reduce greenhouse gas emissions while maintaining reliable public transport services.[38] Furthermore, integrating non-motorized transport options into urban transport plans, such as through cycling and walking infrastructure, enhances sustainability by reducing reliance on cars and minimizing pollution.

52. The Asia-Pacific initiative on electric mobility, launched in August 2022, continues to serve as a practical platform for knowledge exchange and regional cooperation among policymakers and stakeholders in the electric vehicle value chain focused on public transport. As part of the initiative, the secretariat is providing policy and technical support to member States on the transition to electric mobility in public transport. After receiving technical support and developing a draft national policy, the Government of Cambodia adopted a national policy on the development of electric vehicles in May 2024. The development of a national electric mobility policy is also under way in Mongolia, where a national workshop on electric mobility was held in November 2024 and a series of consultations were held with policymakers and private sector stakeholders. The transition to renewable energy sources is key

[36] Sudhir Gota and Cornie Huizenga, *The Contours of a Net Zero Emission Transport Sector in Asia*, p. 4.

[37] Asian Transport Outlook, "Tracking transport and climate change indicators in Asia and the Pacific 2000–2020" (2022), p. 13.

[38] See www.unescap.org/projects/asia-pacific-initiative-on-electric-mobility.

for the transition to electric mobility in Mongolia, as the current energy supply is heavily dependent on coal and fossil fuels.

53. The secretariat provided policy support to Sri Lanka to accelerate the transition to electric mobility. Stakeholder consultations were conducted, technical studies were finalized and a draft national policy on electric mobility was developed, which has yet to be considered and adopted. To further build capacity on the transition to electric mobility in public transport, the secretariat is currently implementing a project to support the Governments of the Lao People's Democratic Republic, the Philippines, Sri Lanka and Tajikistan on electric vehicle financing models and the dissemination of technology and practices for charging infrastructure. One aim of the project is to support target member States in deploying pilot electric bus systems by the end of 2026.

IV. Policy options to enhance the sustainability and resilience of urban public transport systems

54. Local governments can play a central role in shaping public transport systems that are sustainable, inclusive, safe and accessible and that can withstand the impacts of climate events. Local governments can adopt climate action plans that are focused specifically on transport, ensuring that future projects consider climate risks from the outset. In addition, national Governments need to support local governments by providing financial incentives for investments in green infrastructure, such as smart grids and the electrification of transport systems. Stricter building codes also need to be implemented to ensure that new infrastructure is resilient to future risks.[39] Coordination between national and local authorities is essential to ensure that policies are effectively implemented across different levels of government.

55. The challenge for governments and institutions is to strengthen not only their policymaking capacities but also their ability to deliver, enforce and implement resilience and sustainability policies. This requires more stable and innovative financing models to ensure investment in sustainable and resilient public transport infrastructure and services. Effective coordination and information-sharing mechanisms across sectors, including urban planning, transport, energy and finance, are also necessary.

56. In line with these crucial trends, at its eighth session, the Committee on Transport took note of recent developments and progress made in the areas of urban transport, low-carbon mobility and road safety and encouraged member States to promote innovation in urban transport systems in Asia-Pacific cities, to support the transition to low-carbon mobility and to scale up efforts to promote and improve road safety in the region.

57. While the policy options set out in the following sections do not constitute an exhaustive list, they can provide guidance to policymakers, transport planners, transport authorities and other stakeholders on enhancing the sustainability and resilience of urban public transport systems.

A. Develop comprehensive and integrated public transport plans

58. At its eighth session, the Committee on Transport noted the efforts of member States to implement urban transport policies that enhanced road safety and reflected social inclusion and encouraged them to promote innovation in urban transport systems. In this context, national and local governments need

[39] OECD, *Infrastructure for a Climate-Resilient Future* (Paris, 2024).

to make long-term commitments and take a holistic approach to integrated public transport planning to move away from individualized mobility dominated by private vehicles. Public transport strategy should integrate land-use planning with public transport planning, prioritize non-motorized and low-carbon modes of transport, develop intermodal transfer stations, disincentivize the use of private and individual transport modes and harness the use of digital and other emerging transport technologies.

B. Improve urban road safety

59. At its eighth session, the Committee on Transport urged member States to continue and scale up efforts to promote and improve road safety in the region. In order to do so, national and local governments should consider the following actions: adopt the safe system approach; develop and implement national road safety action plans; focus on the safety of vulnerable road users; strengthen legislative frameworks, including for urban speed management; develop safe urban infrastructure; mobilize resources for road safety interventions; improve data quality for effective evidence-based policies; and foster regional and international cooperation.

60. Given the high share of fatalities involving vulnerable road users in Asia-Pacific cities, national and local governments need to scale up efforts to improve road safety, in particular the safety of riders of motorized two- and three-wheelers. Actions that would help to reduce the number of accidents and fatalities in urban areas include the following: improving access to public transport; adopting comprehensive policies that prioritize the safety of pedestrians, cyclists and users of motorized two-wheelers; designing road infrastructure, walkways and cycle lanes with higher safety standards; ensuring strict enforcement of traffic regulations, including helmet wearing; and planning targeted awareness programmes.

C. Harness smart transport technology and innovations

61. Smart transport systems use a combination of diverse technologies to enhance the sustainability of mobility. Such systems can help to increase the efficiency, safety and effectiveness of urban mobility and support the achievement of net-zero targets. They can also help to reduce traffic congestion, optimize routes, provide timely road condition updates and minimize environmental impacts. Examples of such systems are electronic toll collection and weigh-in-motion systems, which streamline traffic flow and manage vehicle loads efficiently. Smart mobility contributes to reduced reliance on private vehicles and increased usage of public transport. At its eighth session, the Committee on Transport took note of the key elements of the Regional Road Map to Support Regional Cooperation for the Wider Deployment of Sustainable Smart Transport Systems in Asia and the Pacific,[40] which member States can use, on a voluntary basis, to develop and implement their smart transport policy plans and strategies.

D. Enhance accessibility and social inclusion

62. National and local governments need to integrate urban planning with public transport development using the concept of transit-oriented development and extend the reach of public transport systems to wider

[40] ESCAP/CTR(8)/4.

communities. Where feasible, the provision of on-demand services can also increase the accessibility of public transport systems.

63. At its eighth session, the Committee on Transport took note of guidelines developed by the secretariat on enhancing social inclusion and innovations in urban transport systems in Asia-Pacific cities.[41] The five major guidelines are: (a) conduct timely data collection and analysis; (b) mainstream social inclusion in urban transport; (c) integrate transport innovation for social inclusion; (d) enhance capacity-building and awareness-raising; and (e) promote inclusive consultation and collaboration.

E. Prioritize disaster resilience and adaptation

64. In the transport sector, climate action is heavily focused on mitigation. There is a need to prioritize resilience and adaptation given the increase in the frequency and intensity of climate events. As part of adaptation planning, the trade-offs between adaptation costs and long-term benefits need to be quantified. Effective adaptation measures require significant financial resources, and funding mechanisms are crucial to ensure that public transport systems can be climate- and disaster-resilient. Resilience planning is fundamental for preparing public transport systems for the growing impacts of climate change, such as more frequent and severe flooding, heatwaves and storms. Local governments must invest in upgrading transport infrastructure to ensure it can withstand such events. Examples of key strategies include elevating roads and railways in flood-prone areas, installing drainage systems to prevent water accumulation and using more durable materials in construction. Urban planning plays an equally important role. By integrating transport planning with land-use planning, local governments can enhance accessibility while ensuring that systems are built with future climate and disaster risks in mind. For instance, transit-oriented development can help reduce vehicle dependency and promote sustainable mobility, which is critical for both climate adaptation and mitigation.

F. Promote low-carbon public transport

65. According to a review of the nationally determined contributions under the Paris Agreement, transitioning to electric mobility, using alternative fuels and developing public transport are among the top priority policies and strategies. Furthermore, Governments have set targets for the share of electric vehicle models in new vehicle sales, for example 25 per cent by 2025 in Nepal and 30 per cent by 2030 in Thailand. However, current trends show that such targets are difficult to achieve. At its eighth session, the Committee on Transport encouraged members and associate members to continue to support projects on the transition to low-carbon mobility. Governments need to align national transport and public transport policies and processes with global commitments such as the 2030 Agenda for Sustainable Development and the Paris Agreement. Governments have an opportunity to update their low-carbon goals and targets as part of the 2025 update of their nationally determined contributions. Additional opportunities will be provided by the United Nations Decade of Sustainable Transport, proclaimed by the General Assembly for the 10-year period beginning on 1 January 2026, an implementation plan for which is being developed by the Department of Economic and Social Affairs of the Secretariat in collaboration with the regional commissions and in consultation

[41] ESCAP/CTR(8)/6.

with Member States, the United Nations system, intergovernmental organizations and other stakeholders.[42]

G. Mobilize green finance and promote regional cooperation for public transport

66. Governments, international organizations and private investors need to collaborate to find innovative financing solutions to fund the transition to sustainable and resilient urban transport. Methods and sources such as public funding, grants, borrowing and loans, green bonds, climate finance and public-private partnerships are widely used to support projects in the transport sector.[43] For example, several Asian cities, including Thimphu, have made use of international climate finance from the Green Climate Fund to support sustainable transport initiatives. Local governments are also using revenue from congestion charges and carbon pricing programmes to finance urban transport infrastructure upgrades. In addition, the international community, at the twenty-ninth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, committed to collectively mobilize $300 billion a year in climate finance for developing countries. However, there is a need to facilitate access to these funds for developing countries and cities. Furthermore, national and local governments would benefit from capacity-building support to develop bankable public transport projects. There is a need to increase the number of transport projects supported by climate funding and clean development mechanisms. Given that the availability of renewable energy is closely linked with sustainable public transport, cross-sectoral projects covering the urban planning, transport and energy sectors are important.

67. As member States and cities are at different stages in the development of sustainable and resilient public transport systems, there are opportunities to share knowledge, best practices, experiences and resources and to enhance peer-to-peer learning. On the integration of public transport modes, local governments could learn from the experiences of Seoul, Singapore and Tokyo, as well as Hong Kong, China. National Governments could draw useful lessons from the experiences of China and India in planning for and transitioning to electric mobility for public transport. The secretariat and development partners should continue to facilitate exchanges and learning at the national and local levels. The voluntary Asia-Pacific initiative on electric mobility can provide a platform for sharing experiences. The Transport Research and Education Network,[44] established in 2021, serves as a voluntary mechanism to coordinate and facilitate knowledge-sharing and networking among transport research institutes and stakeholders on sustainable transport research and training. The secretariat also aims to utilize the network to plan more events to exchange experiences among urban transport stakeholders, practitioners, researchers and academic institutions.

[42] General Assembly resolution 78/148.

[43] Partnership on Sustainable, Low Carbon Transport, “SLoCaT transport, climate and sustainability global status report: 3rd edition – module 5: financing sustainable transport in times of limited budgets – overview” (Brussels, 2023), p. 370.

[44] See www.unescap.org/projects/tren.

V. Issues for consideration by the Commission

68. The Commission may wish to take note of the activities undertaken to support the development of sustainable urban transport systems in the region and the policy options that contribute to enhancing the sustainability and resilience of urban public transport systems described in the present document and provide guidance to the secretariat for its future work.